CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

21MT653

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025

Mechatronics Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define Measurement System. Explain the basic elements of measurement system with a neat diagram and give an example for the same. **(08 Marks)**
b. Define Control System. Make use of an example to explain different types of Control systems with neat diagrams. **(06 Marks)**
c. Explain Automatic washing machine system with a neat diagram. **(06 Marks)**

OR

2 a. Define closed loop system. Explain the basic elements of closed loop system. **(08 Marks)**
b. Define System. Explain the basic elements of Mechatronics system. **(06 Marks)**
c. Explain Engine Management System with a neat diagram. **(06 Marks)**

Module-2

3 a. Define Sensor. Explain the classification of Sensors. **(08 Marks)**
b. Explain the construction and working Principle of LVDT with neat diagrams. **(06 Marks)**
c. Define Light sensor. Explain different types of light sensors with diagrams. **(06 Marks)**

OR

4 a. With a neat sketch explain the construction and working principle of the types of Hall-Effect Sensors. Mention its applications. Explain one of its application. **(10 Marks)**
b. Explain the following terms used to define the performance of transducers.
i) Sensitivity
ii) Stability
iii) Range and Span
iv) Dead band
v) Repeatability **(05 Marks)**
c. Define Transducer. Explain different types of transducers. **(05 Marks)**

Module-3

5 a. Explain low-pass filters, high-pass filters, band pass filters and band-stop filters with response curves. **(08 Marks)**
b. Explain the two different types of Digital to Analog Converters with neat diagram. **(06 Marks)**
c. Define an op-amp. Explain inverting op-amp and non-inverting op-amp with neat circuit diagrams and voltage gain equations. **(06 Marks)**

OR

6 a. Define SCADA. Explain the architecture of SCADA with a neat diagram. **(08 Marks)**
b. Define DAQS,. Explain Data Acquisition System with neat diagram. **(06 Marks)**
c. Explain Successive Approximation type and Ramp type ADC with neat diagram. **(06 Marks)**

Module-4

7 a. Explain Brushless Permanent Magnet DC Motor with a neat diagram. **(06 Marks)**

b. Explain different types of stepper motor with neat sketches. **(06 Marks)**

c. Explain the architecture of PLC with neat diagram and define PLC. **(08 Marks)**

OR

8 a. Explain brush type DC Motor. **(06 Marks)**

b. Define Input/Output processing in PLC. Explain the two different types of Input/Output processing in PLC. **(06 Marks)**

c. Explain Master and Jump Controls using ladder diagrams. **(08 Marks)**

Module-5

9 a. Define Mechatronics System. Explain the Integrated Design Issues in Mechatronics. **(08 Marks)**

b. Explain mechatronics key elements. **(06 Marks)**

c. Explain Pick and Place Robot with neat diagram. **(06 Marks)**

OR

10 a. Explain Mechatronics design process. **(08 Marks)**

b. Explain the application Areas of Mechatronic System. **(06 Marks)**

c. Explain automatic car park barrier system with neat diagram. **(06 Marks)**

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